

**REMARKS**

Claims 1 and 8 were rejected as unpatentable over Beauducel in view of Palmer. Claims 2-4 and 11 were rejected as unpatentable over Beauducel in view of Palmer in view of Potratz. Claim 5 was rejected as unpatentable over Beauducel in view of Palmer in view of Scott. Claims 6-7 were rejected as unpatentable over Beauducel in view of AAPA. Claims 12 and 13 were rejected for purported lack of disclosure. Applicant requests reconsideration and continued examination.

The specification was amended to recite that the communication can be asynchronous. The specification clearly taught that there is no need for synchronous communication, which means that the binary modulated signal can be communicated by asynchronous communications. The specification taught that the prior systems used frame synchronization and coherent bit reclocking that is known as bit synchronization. The specification taught that no synchronization was required, and was amended to recite that the communication can be asynchronous. Claims 1 and 11 recite that the modulated binary signal has a pulse width duration that is representative of the analog input, and that the modulated binary signal is communicated asynchronously. Claims 12 and 13 were amended to recite that the communication is frame asynchronous, that is, without framing words. New claims 14 and 15 were added to recite that the communication is bit asynchronous, that is, without a synchronous clock signal that is used for bit recovery upon coherent reception of the binary modulated signal.

1       The cited references Beauducel, Palmer, and Potratz teach  
2 synchronous communications.  
3

4       Patentability depends on both the problem solved and the  
5 solution thereto. The problem solved is bit and frame synchronous  
6 communication of a digital signal presenting an analog signal. The  
7 solution thereto is a sigma-delta modulator providing a pulse width  
8 modulated binary signal that has a pulse width duration  
9 representative of the analog input and the use of a pulse width  
10 detector upon reception, so that, the modulated binary signal can  
11 be communicated asynchronously, without bit or frame  
12 synchronization.

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14       The previous examination statement that Palmer teaches the  
15 sigma-delta modulators have been "USED WITH" a laser is devoid of  
16 specificity and articulated analysis as to how sigma-delta  
17 modulators are used with a laser in Palmer. That is, the  
18 examination fails to consider the explicit teachings of the cited  
19 references for what they fairly teach. Palmer teaches a sigma-delta  
20 modulator for generating a local oscillator clock signal that is  
21 used for modulating a laser output using a conventional modulator,  
22 whereas the present invention uses a sigma-delta modulator for  
23 modulating an input analog signal into a binary output signal that  
24 then drives a laser transmitter. Nowhere in Palmer is there a  
25 teaching to modulate an input analog signal by a sigma-delta  
26 modulator. The DIGITAL input signal that is to be transmitted in  
27 Palmer is first processed through elements 12, 14, 16, 18, and 20  
28 where it is then modulated by multipliers 24 and 28, that are

1 conventional mixers, and summed by a summer 30, and then amplified  
2 by amplifier 32, modulated by modulator 36, and then finally  
3 transmitted using a laser transmitter 34. The local oscillator 26  
4 provides the coherent clock modulation signal and is used to drive  
5 multiplier 24 and 28 as modulators. SIGNIFICANTLY, Palmer teaches  
6 that the local oscillator 26 can be a VCO, PLO, DRU, or a sigma-  
7 delta modulator. (Col.3 line 37-46) Hence, Palmer is teaching the  
8 use of a sigma-delta modulator as a local oscillator for driving a  
9 modulator. It would be helpful that the examination recognize and  
10 acknowledge the explicit teachings of the cited reference Palmer.  
11 Palmer teaches digital input signal modulation using multipliers 24  
12 and 28. Palmer teaches using a sigma-delta modulator 26 for  
13 generating a local oscillator signal that drives the multipliers 24  
14 and 28 as modulators. Palmer teaches away from using a sigma-delta  
15 modulator for modulating an analog input signal. The present  
16 invention teaches using a sigma-delta modulator for modulating an  
17 input analog signal. Palmer teaches the use of a local oscillator  
18 26 for synchronized laser communications. The present invention  
19 solves the problem of synchronized laser communications. Palmer  
20 teaches away from the invention as to both the problem solved and  
21 the solution.

22  
23       The examination then equates Palmer's teaching that a sigma-  
24 delta modulator can be used as a local oscillator within a laser  
25 communication system, with a vague teaching that the sigma-delta  
26 modulator can be "used with" a laser, and then with the present  
27 invention particular teaching that a sigma-delta modulator is used  
28 to modulate an analog input signal and directly drive a laser

1 transmitter with a binary signal, that solves the problem of  
2 synchronized laser communications. This improper equation is based  
3 on the teachings of the present invention, not Palmer, and hence,  
4 the unsupported interpretation of the teachings of Palmer is  
5 classical hindsight reconstruction and evinces nonobviousness.

6

7       The examination confuses hindsight reasoning with hindsight  
8 reconstruction. Hindsight reasoning looks to prior art teachings  
9 and determines whether those prior art teachings suggest the  
10 claimed combination. Forbidden hindsight reconstruction looks to  
11 claimed combination and finds prior art teachings of the elements  
12 of the claimed combination, and then, improperly combines the  
13 elements along the lines of the claimed invention without required  
14 prior art teachings to do so, and hence, improperly relies upon the  
15 teachings of the present invention. Here, the examination found  
16 that cited references suggest that the sigma-delta modulator drives  
17 a laser as in the present claims. This was learned from the present  
18 specification after the invention was made and not from Palmer. The  
19 examination, in hindsight, conveniently picks out a sigma-delta  
20 modulator and laser transmitter in Palmer, and then, improperly  
21 combines the sigma-delta modulator and laser transmitter of Palmer  
22 along the lines of the present invention, directly contrary to the  
23 teachings of Palmer and directly contrary to the combined teachings  
24 of Palmer and Beauducel. The examination then asserts that Palmer  
25 teaches that a sigma-delta modulator can be "used with" a laser  
26 transmitter. Palmer uses a sigma-delta modulator to merely generate  
27 a local oscillator signal, which, in and of itself, does not  
28 modulate an analog input signal nor directly drive a laser

1 transmitter, as gleaned from the present invention that does use  
2 the sigma-delta modulator to modulate an analog input signal for  
3 generating a binary signal driving a laser transmitter for enabling  
4 asynchronous communication.

5  
6 The examination failed to consider both the problem solved and  
7 the solution thereto. The examination must recognize that  
8 obviousness is a two-part analysis as to suggesting both the  
9 problem solved and the solution thereto. That is, the examination  
10 is completely silent on how the cited references teach the  
11 synchronization problem. When the cited references do not teach the  
12 problem solved, the cited references cannot possibly teach a  
13 solution thereto. The examination should at least acknowledge that  
14 the cited references only teach synchronous communications. The  
15 examination failed to recite any text in the cited references that  
16 teach specifically how the sigma-delta modulator in Palmer is to be  
17 combined with a laser to provide asynchronous communication.

18  
19 While the examination may be able to locate isolated teachings  
20 of claimed elements, the combination of these elements along the  
21 lines of the claimed invention to solve the problem solved must be  
22 taught in the cited references, as it is the cited references that  
23 provide knowledge of one skilled in the art. When the examination  
24 attempts to combine prior art teachings and elements, contrary to  
25 the explicit teachings of those cited references, the examination  
26 is a product of tortured reasoning that is the hallmark of  
27 nonobviousness.  
28

1       Obviousness is determined from the prior art as a whole,  
2 fairly read for what it fairly teaches as to the cooperative  
3 combination of these parts as particularly claimed, as to both the  
4 problem solved and the solution thereto.

5  
6       The discussion is focused on claim 1. The invention solves  
7 the problem of required synchronized transmissions of laser  
8 signals. (See discussion of framing requirements in the background  
9 section of the application, for example on page 3 where it states  
10 that "These synchronization frames words are overhead data and are  
11 typically one to ten percent of the information data words.") The  
12 cited references do not solve the synchronized transmission  
13 problem. If the cited references do not teach the problem solved,  
14 the cited references cannot possibly teach the solution thereto.  
15 The examination did not indicate how the cited references suggested  
16 the problem solved. The solution is the use of the sigma-delta  
17 modulator for modulating an analog input signal and for driving a  
18 laser transmitter with a digital binary signal, for solving the  
19 problem of required synchronized self-clocking communications. This  
20 sigma-delta modulator, in the preferred form, provides a  
21 transmitted binary signal that is not self-clocking with  
22 synchronized transitions nor used with synchronized frame words.  
23 Claim 1 particularly recites the cooperative elements, a sigma-  
24 delta modulator driving a laser transmitter communicating a binary  
25 laser signal. This combination need not employ synchronized laser  
26 communications, the problem solved, but rather can be used  
27

1 | asynchronously, as a significant advancement in the art, properly  
2 | deserving of patent protection.

3 |  
4 | The examination cites three references for rejecting claim 1,  
5 | incorrectly suggesting that these two cited references suggest the  
6 | combination of a sigma-delta modulator for driving a laser  
7 | transmitter for communicating the binary modulated laser signal.  
8 | Particularly, the examination clearly states: "Beauducel et al does  
9 | not specify a modulated binary laser signal", and "Palmer et al  
10 | teaches a communication system wherein a sigma-delta modulator is  
11 | used with a laser transmitter". This is where the examination  
12 | attempts to use forbidden hindsight reconstruction, specifically  
13 | through the use of the phrase "used with". The phrase "used with"  
14 | is where the examination attempts to combine prior art elements, a  
15 | sigma-delta modulator generating a clock signal and a laser  
16 | transmitter, along the lines of the present invention where the  
17 | sigma-delta modulator particularly modulates an analog input signal  
18 | for generating a binary signal for particularly driving a laser  
19 | transmitter, without a suggestion to do so, as a strong indication  
20 | of improper hindsight reconstruction, and is where the examination  
21 | attempts to combine prior art elements through tortured reasoning,  
22 | which is strong evidence of nonobviousness.

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24 |  
25 | This improper hindsight reconstruction becomes even more  
26 | apparent when the improperly suggested combination of the cited  
27 | references cannot possibly be combined consistent with their  
28 | teachings along the lines of the claimed invention. Palmer uses a

1 sigma-delta modulator to generate a local clocking signal for  
2 synchronized communications in a laser communication system.  
3 Surely, the examination should recognize the difference between a  
4 local oscillator and an input signal modulator. While the sigma-  
5 delta modulator is "used-with" a laser transmitter, the sigma-delta  
6 modulator is merely used to generate a local oscillator clock  
7 signal, such as the clock signal generated by Beauducel's  
8 "SYNCHRONIZATION ELEMENT" 5. The sigma-delta modulator used in  
9 Beauducel and in the present invention is used to provide a  
10 modulated signal, whereas the sigma-delta modulator in Palmer does  
11 not, and is only used to generate a high-speed synchronization  
12 local oscillator clock signal. ("Alternatively, fractional  
13 frequency dividers using sigma-delta modulation of the feedback  
14 divider may be USED FOR THE GENERATION OF SUB-INTER MULTIPLES OF  
15 THE BASE FREQUENCY", Palmer Col. 3 line 44) Hence, it must be  
16 clearly understood that Palmer does not teach using a sigma-delta  
17 modulator for modulating the analog input, but rather uses a sigma-  
18 delta modulator for generating a digital clock signal for clocking  
19 a modulator. Though the term "used with" may be grossly accurate,  
20 that surely fails to focus the discussion on how the sigma-delta  
21 modulator is actually used in Palmer, for what Palmer fairly  
22 teaches.

23  
24 Palmer teaches synchronized laser communications, the very  
25 problem the present invention solves. With kind due respect, Palmer  
26 is irrelevant to an obviousness rejection. Perhaps applicant can be  
27 of assistance.

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1 SIGNIFICANTLY, the combination of Palmer and Beauducel, for  
2 what they fairly teach, is to replace the synchronization element 5  
3 of Beauducel with a sigma-delta modulator of Palmer for generating  
4 the local oscillator synchronization signal. Hence, the claimed  
5 combination solution is clearly NOT remotely suggested by the  
6 combination of the cited references, and surely does not solve the  
7 problem solved of required synchronization. As such, the  
8 combination of Palmer and Beauducel teaches synchronized nonbinary  
9 laser communications and teaches away from the present invention.  
10 Also, the problem solved is not remotely suggested by the cited  
11 references. Beauducel specifically teaches SYNCHRONIZED  
12 communications using the synchronization element 5. Further, the  
13 coding circuit 6 is used to code the signal with a synchronization  
14 clock signal. "the stream of 1-bit words coming from the (sigma-  
15 delta) modulator 4 is applied directly here to a coding circuit 6  
16 applying a predetermined coding allowing a clock signal to be  
17 conveyed at the same time as the signals, ..., suited to an optical  
18 type transmission". Beauducel specifically teaches away from the  
19 use of binary signal. Hence, Beauducel teaches non-binary  
20 synchronized communications, the very problem that the present  
21 invention solves. Palmer teaches a system for use in an OC-XX or a  
22 STS-XX SYNCHRONOUS OPTICAL NETWORK. Hence, Palmer also teaches  
23 synchronized optical communications that coincidentally uses a  
24 sigma-delta modulator to generate a local oscillator clock signal.  
25 Hence, the combination of Beauducel and Palmer does not suggest  
26 using a sigma-delta modulator for directly modulating an analog  
27 input into an output binary data stream for driving a laser  
28 transmitter. Hence, both Beauducel and Palmer teach optical

1      SYNCHRONOUS communication, and do not remotely suggest the problem  
2      solved, and as such, cannot possibly suggest the solution thereto,  
3      as presently claimed. In fact, the cited references teach just the  
4      opposite of the present invention.

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6      The examination states that Beauducel teaches that different  
7      transmitters can be used, and "Based on this, the examiner turns to  
8      Palmer to show that it is well known in the art to combine a sigma  
9      delta modulator and a laser in an optical transmission system".  
10     This is the classical BAG-OF-PARTS rejection based upon forbidden  
11     hindsight reconstruction, as it is devoid of any discussion on how  
12     the sigma-delta modulator in Palmer is actually "used with" the  
13     laser system, and how it can be combined with Beauducel. When one  
14     fairly reads Palmer, it is clear that the sigma-delta modulator is  
15     not modulating the analog input for driving a laser modulator, but  
16     rather is merely used for generating a clock for synchronously  
17     driving the data stream modulator that in turn drives the laser  
18     transmitter. The cited references teach synchronous communications.  
19     The inventor here has proceeded directly contrary, and hence, the  
20     cited references are strong evidence of nonobviousness.

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1       Potratz teaches the use of a sigma-delta modulator for  
2 providing a pulse width modulated signal that is representative of  
3 an analog signal. This is well known prior art. Potratz uses the  
4 signal with respect to a clock under timing of Figure 4B. To  
5 perfect synchronized detections, a 10MHz clock is used. For  
6 communication purposes, the interface provides the CPU with a  
7 multibit resolution signal representative of the transmittance of  
8 red and infrared light from LED 16 and 18. The multibit resolution  
9 signal is not a pulse width modulation signal having a pulse width  
10 duration representative of an analog input. Potratz teaches the use  
11 of synchronized detections and multibit resolution, and hence teach  
12 away from the present invention.

13

14       Potratz taught pulse width modulation of a binary signal where  
15 the pulse width is representative of an analog signal, which binary  
16 signal is converted into a clocked multibit resolution digital  
17 signal for synchronized communications to a CPU. Beauducel taught  
18 using sigma-delta modulator and a synchronizing element (5) to  
19 generate a modulated binary signal representative of an analog  
20 signal for synchronized communications. Palmer taught using a VCO  
21 26 for modulating a laser signal to provide bit-synchronized  
22 communication.

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The cited references do not suggest using a sigma-delta modulator for modulating an analog input into a binary signal for asynchronous laser communications. The cited references do not suggest the problem of asynchronous laser communications, the problem solved by the present invention, as both of the cited references teach synchronous communication, and as such, cannot possibly suggest the problem solved or the solution thereto. The cited references do not suggest the claimed invention that uses a sigma-delta modulator for converting an analog input signal into a binary signal for laser communications for solving the problem of synchronous laser communications.

13 On the contrary, the cited references positively teach  
14 synchronized communications, and no combination of these references  
15 can possibly teach or suggest asynchronous communication.  
16 Particularly, the cited references do not teach nor suggest  
17 translating an analog signal into a pulse width modulated signal  
18 having a pulse duration representative of the analog signal for  
19 providing a modulated binary signal that is asynchronously  
20 communicated and detected using pulse width detection. Applicant  
21 requests allowance of the claims.

**Respectfully Submitted**

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